

CLAIMS

What is claimed is:

1. A data center, comprising:
 - at least one modular computing module, each including:
 - 5 an intermodal shipping container configured in accordance to International Organization for Standardization (ISO) container manufacturing standards for transport via an intermodal transport infrastructure;
 - a plurality of computing systems mounted within the intermodal
 - 10 container and configured to be shipped and operated within the intermodal shipping container.
2. The data center of claim 1, further comprising a temperature control system for maintaining a predetermined air temperature surrounding the computing systems.
3. The data center of claim 1, in which the computing systems are arranged to
- 15 define an access way within the corresponding intermodal shipping container to provide human access to the computing systems.

4. The data center of claim 1, further comprising at least one of:
- an interconnecting module to interconnect a plurality of the modular computing modules, the interconnecting module including another of said intermodal shipping container;
 - 5 a power generating module for generating power for the at least one modular computing module, the power generating module including another of said intermodal shipping container;
 - a cooling module of a temperature control system, the cooling module including another of said intermodal shipping container;
 - 10 a power and cooling module for generating power and for providing cooling for the temperature control system, power and cooling module including another of said intermodal shipping container; and
 - a cooling tower in communication with the modular computing module, the cooling tower comprising at least one of an evaporative cooler and a condenser portion of
 - 15 the temperature control system wherein the temperature control system is a direct expansion refrigeration system.
5. The data center of claim 1, in which the computing systems are mounted within mounting structures, each mounting structure being one of a rack mounting structure and a shelf mounting structure.
- 20 6. The data center of claim 1, wherein the computing systems are mounted within mounting structures that are an integral structural component of the intermodal shipping container.

7. The data center of claim 1, in which the modular computing module further includes a plurality of computing system enclosures for enclosing and mounting the computing systems within the enclosures, the computing system enclosures being mounted within the intermodal shipping container, the data center further comprising a
5 temperature control subsystem for each enclosure to provide independent temperature control within the enclosure.

8. The data center of claim 7, in which the temperature control subsystem of each enclosure includes a blower and an evaporator coil and in which the blower includes a blower motor and blower blades mounted external and internal to the intermodal
10 shipping container, respectively.

9. The data center of claim 7, in which each computing system enclosure defines a first delivery plenum and a second return plenum in thermal communication with the corresponding temperature control subsystem, the first and second plenums being in thermal communication with the computing system contained within the
15 corresponding enclosure.

10. The data center of claim 9, in which each computing system enclosure includes a gas-side economizer in thermal communication with the corresponding temperature control subsystem.

11. The data center of claim 7, in which each enclosure includes a door for
20 access to the computing systems contained in the enclosure.

12. The data center of claim 1, in which the intermodal shipping container has a height selected from approximately 8 feet 6 inches and 9 feet 6 inches and a width of approximately 8 feet.

13. A method for deploying a data center, comprising:

5 building at least one modular computing module at a first site, each including:

an intermodal shipping container configured in accordance to

International Organization for Standardization (ISO) container

manufacturing standards for transport via an intermodal transport

10 infrastructure; and

a plurality of computing systems mounted within the intermodal

container and configured to be shipped to and operated within the

intermodal shipping container at a data center site;

transporting the at least one modular computing module to the data center

15 site different from the first site via the intermodal transport infrastructure; and

connecting at least one resource connection to the at least one modular

computing module.

14. The method of claim 13, in which at least one resource connection is selected from the group consisting of electricity, natural gas, water, and Internet access.

15. The method of claim 13, further including:
testing the computing systems of each modular computing module at the
first site.

16. The method of claim 13, in which the transporting via the intermodal
5 transport infrastructure includes transporting via at least one of air, road, rail, and vessel.

17. The method of claim 13, in which the computing systems are arranged to
define an access way within the corresponding intermodal shipping container to provide
human access to the computing systems.

18. The method of claim 13, in which the building further includes at least one
10 of:

building an interconnecting module to interconnect a plurality of the
modular computing modules, the interconnecting module including another of said
intermodal shipping container;

building a power generating module for generating power for the at least
15 one modular computing module, the power generating module including another of said
intermodal shipping container;

building a cooling module of a temperature control system, the cooling
module including another of said intermodal shipping container;

building a power and cooling module for generating power and for
20 providing cooling for the temperature control system, power and cooling module
including another of said intermodal shipping container; and

building a cooling tower containing a condenser in fluid communication
with the power and cooling module.

19. The method of claim 13, in which the building includes mounting the
computing systems within mounting structures, each computing system being one of rack
5 mounted and shelf mounted within the corresponding mounting structure.

20. The method of claim 13, in which the building includes mounting the
computing systems within mounting structures that are an integral structural component
of the intermodal shipping container.

21. The method of claim 13, in which the building includes enclosing and
10 mounting the plurality of computing systems within computing system enclosures, the
computing system enclosures being mounted within the intermodal shipping container.

22. The method of claim 21, in which the building includes installing a
temperature control subsystem for each computing system enclosure configured to
independently control the temperature within the corresponding enclosure.

15 23. The method of claim 22, in which the temperature control subsystem of each
enclosure includes a blower and in which the building includes mounting a blower motor
and blower blades of the blower external and internal to the intermodal shipping
container, respectively.

24. The method of claim 22, in which each computing system enclosure defines a first delivery plenum and a second return plenum in thermal communication with the corresponding temperature control subsystem, the first and second plenums being in thermal communication with the computing system contained within the corresponding enclosure.

25. The method of claim 22, in which the building includes installing a gas-side economizer for each computing system enclosure, the gas-side economizer being in thermal communication with the corresponding temperature control subsystem of the computing system enclosure.

26. The method of claim 21, in which each enclosure includes a door for access to the computing systems contained in the enclosure.

27. The method of claim 13, in which the intermodal shipping container has a height selected from approximately 8 feet 6 inches and 9 feet 6 inches and a width of approximately 8 feet.

28. The method of claim 13, further including servicing the computing systems by one of:

performing on-site maintenance at the data center site; and
performing off-site maintenance by transporting the at least one modular computing module to a servicing site different from the data center site via the intermodal transport infrastructure.

29. A data center, comprising:

a modular computing module, including:

an intermodal shipping container configured for transport via an
intermodal transport infrastructure with respect to at least one of

5 height, length, width, weight, and lifting points of the container;

a plurality of computing systems mounted within the intermodal
container and configured to be shipped and operated within the
intermodal shipping container;

10 a power distribution unit configured to distribute power from a power
source to the plurality of computing systems; and

a network interface configured to interface between an Internet access
connection and the computing systems; and

a temperature control system for maintaining a predetermined air
temperature surrounding the computing systems.

15 30. The data center of claim 29, further comprising at least one of:

an interconnecting module to interconnect a plurality of the modular
computing modules, the interconnecting module including another of said intermodal
shipping container;

20 a power generating module for generating power for the at least one
modular computing module, the power generating module including another of said
intermodal shipping container;

a cooling module of the temperature control system, the cooling module
including another of said intermodal shipping container;

a power and cooling module for generating power and for providing cooling for the temperature control system, power and cooling module including another of said intermodal shipping container; and

a cooling tower containing a condenser in fluid communication with the
5 power and cooling module.

31. The data center of claim 29, in which the modular computing module further includes a plurality of computing system enclosures for enclosing and mounting the computing systems within the enclosures, the computing system enclosures being mounted within the intermodal shipping container, and in which the temperature control
10 system includes a temperature control subsystem for each enclosure to provide independent temperature control within the enclosure.

32. The data center of claim 31, in which each computing system enclosure defines a first delivery plenum and a second return plenum in thermal communication with the corresponding temperature control subsystem, the first and second plenums
15 being in thermal communication with the computing system contained within the corresponding enclosure.

33. The data center of claim 32, in which each of the first and second plenums is tapered along its length.

34. The data center of claim 31, in which each computing system enclosure includes a gas-side economizer in thermal communication with the corresponding temperature control subsystem.

35. The data center of claim 29, in which the intermodal shipping container has
5 a height selected from approximately 8 feet 6 inches and 9 feet 6 inches and a width of approximately 8 feet.